

RELATIONSHIP BETWEEN HEARING AND MENTAL HEALTH FACTORS

Young-Ju Jee¹ and Young-Sun Park²

¹*Dept. of Nursing, Kyungnam University
Woryeongbuk 16-gil Masanhappo-gu, Changwon-si,
Gyeongsangnam-do 631-701, Korea*

²*Dept. of Nursing, Kyungbok University
154 Sinpyeong-ro Sinbuk-myeon, Pocheon-si, Gyeonggi-do 11138, Korea
¹jeeyoungju@kyungnam.ac.kr, ²yspark@kyungbok.ac.kr*

Abstract— This is a descriptive survey study to investigate the relationship between mental health variables and the degree of hearing, using raw data from the 7th NHNES, in the population in their 40s and over when the hearing loss occurs generally. Of the total 8,127 data, only 4,197 data from those who were subjected to hearing test, aged 40 years or older, and responded to the study variables without any omission were included in the analysis. The general characteristics, average daily sleep time during weekdays, perceived level of usual stress, presence of depressed feeling for two consecutive weeks, quality of life(EQ-5D), and degree of hearing of subjects were analyzed using descriptive statistics, ANOVA, and Pearson's correlation coefficients with the SPSS 20.0 program. The results showed that the degree of hearing scored 1.22 ± 0.52 and had significant association with average daily sleep time ($r = -0.068$, $p < .001$), level of depressed feeling for two consecutive weeks ($r = -0.062$, $p < .001$), quality of life (EQ-5D) ($r = -0.236$, $p < .001$). These results suggested the necessity of development and application of intervention program for the improvement of sleep, depressed feeling, and quality of life in populations with hearing problems.

Keywords— Sleep, Stress, Depression, Quality of life, Hearing

1. INTRODUCTION

The extension of life expectancy due to medical advancement fueled by the improvement of healthcare and socioeconomic development since the 21st century led to a rapid increase in the elderly population [1]. The presbycusis (elderly hearing loss) has become an important issue as such life extension has made quality of life to be attended [2]. The presbycusis, a difficulty in hearing sound due to hearing loss by aging, usually occurred in the 40s and exacerbated by the 50s. The hearing loss is defined as a condition in which the sound of normal conversation corresponding to 40dB or less is not heard. The presbycusis is recognized as an important disease in that it causes adverse effects such as personal social isolation, self-esteem, social activity, psychological alienation, depression, and the quality of life by interfering with free and efficient communication [3]. Efforts to reduce stress and the practice of healthy living style are one of the ways to decrease the risk of the presbycusis as well as prevent many diseases [4]. A recent study reported that the hearing loss also affected sleep time, a mental health index, suggesting that the presbycusis is highly correlated with variables that determine the mental health [5]. The purpose of this

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study was, accordingly, to investigate the relationship between mental health variables and the degree of hearing, using raw data from the 7th National Health and Nutrition Examination Survey (NHNES), in the population in their 40s and over when the hearing loss occurs generally.

2. METHOD

2.1. DESIGN

This descriptive survey study was to investigate the relationship between mental health variables and the degree of hearing, using raw data from the 7th NHNES, in the population in their 40s and over when the hearing loss occurs generally.

2.2. SUBJECTS

From the 192 sample survey district included in the 7th NHNES, after excluding facilities such as nursing homes, military facilities, prisons, and foreign households, appropriate households were determined and, among which, 23 sample households were selected using the systematic sampling method. All the members of the selected household who are over 1 year old and meet the requirements of appropriate household members were included in the analysis [6]. Of the total 8,127 data, only hearing test subjects aged 40 years or older were selected. The data in which the variables used in this study such as gender, age, education level, quality of life (EQ-5D), economic activity status, average daily sleep time during weekdays, perceived level of usual stress, presence of depressed feeling for two consecutive weeks were omitted, non-responded were excluded, resulting in 4,197 data used in the analysis of this study.

2.3. INSTRUMENT

The questionnaires used in this study was designed to measure general characteristics (gender, age, level of education, economic activity status), economic activity status, average daily sleep time during weekdays, perceived stress level in daily life, presence of depressed feeling for two consecutive weeks, and quality of life(EQ-5D). The average sleep time during weekdays was calculated in minutes using the time of going to bed and waking up. The level of usual stress indicates the degree of feeling stress in everyday life. The presence of depressed feeling for two consecutive weeks were measured using the responses 'yes' or 'no' for the question of 'Did you experience the depressed feeling for two consecutive weeks?'. The quality of life (EQ-5D) was measured by a combination of five levels of health-related quality of life (mobility, self care, usual activities, pain/discomfort, anxiety/depression).

2.4. ANALYSIS

The general characteristics, average daily sleep time during weekdays, perceived level of usual stress, presence of depressed feeling for two consecutive weeks, and quality of life(EQ-5D) of subjects were analyzed using the descriptive statistics. The difference in average daily sleep time during weekdays, perceived level of usual stress, presence of depressed feeling for two consecutive weeks, and quality of life(EQ-5D) by degree of hearing were analyzed using ANOVA, and post-tested using Tukey HSD. The associations among average daily sleep time during weekdays, perceived level of usual stress, presence of depressed feeling for two consecutive weeks, quality of life(EQ-5D), and degree of hearing were measured using the Pearson's correlation coefficients. All statistic procedures were conducted using IBM SPSS 20.0 program.

3. RESULTS

3.1. GENERAL CHARACTERISTICS

The 43.5% of the participants were females, average of age 59.47yrs, High school graduation was highest (29.4%) (Table I).

Table I. General Characteristics (N = 4,197)

Characteristics	Categories	n(%)M±SD
Gender	Male	1826(43.5)
	Female	2371(56.5)
Age(yr)		59.47±11.78
Level of education	1. Korean Studies	1(0.0)
	2. None	233(5.6)
	3. Elementary school	832(19.8)
	4. Middle School	608(14.5)
	5. High School	1235(29.4)
	6. Two-year / three-year college	327(7.8)
	7. University	728(17.3)
	8. Graduate School	233(5.6)

3.2. AVERAGE DAILY SLEEP TIME DURING WEEKDAYS, PERCEIVED LEVEL OF USUAL STRESS, PRESENCE OF DEPRESSED FEELING FOR TWO CONSECUTIVE WEEKS, QUALITY OF LIFE(EQ-5D), AND DEGREE OF HEARING

The mean score for daily sleep time (min) was 419.10±83.85, Level of usual stress was 2.91±0.73, Depression level for 2 consecutive weeks was 1.87±0.33, Quality of life (EQ-5D) was 0.93±0.12 and Degree of hearing was 1.22±0.52 (Table II).

Table II. Average daily sleep time, level of usual stress, Depression level for 2 consecutive weeks, Quality of life (EQ-5D), and Degree of hearing (N = 4,197)

Variables	M±SD	Range
Average daily sleep time (min)	419.10±83.85	5 - 900
Level of usual stress	2.91±0.73	1 - 4
Depression level for 2 consecutive weeks	1.87±0.33	1 - 2
Quality of life (EQ-5D)	0.93±0.12	-0.171 - 1
Degree of hearing	1.22±0.52	1 - 4

3.3. DIFFERENCE IN AVERAGE DAILY SLEEP TIME DURING WEEKDAYS, PERCEIVED LEVEL OF USUAL STRESS, PRESENCE OF DEPRESSED FEELING FOR TWO CONSECUTIVE WEEKS, AND QUALITY OF LIFE(EQ-5D) BY DEGREE OF HEARING

In the group Not inconvenient, Somewhat uncomfortable, Very uncomfortable, and Do not listen at all, there was a significant difference in Average daily sleep time (min) ($p < .001$), Depression level for 2 consecutive weeks ($p < .001$), Quality of life (EQ-5D) ($p < .001$), and there was no significant difference in Level of usual stress ($p = .834$) (Table III).

Table III. Differences in average daily sleep time, level of usual stress, Depression level for two consecutive weeks, Quality of life (EQ-5D), and Degree of hearing by Degree of hearing (N = 4,197)

Degree of hearing	1. Not inconvenient	2. Somewhat uncomfortable	3. Very uncomfortable	4. Do not listen at all	F	p	Tukey HSD
	(a)	(b)	(c)	(d)			
	M±SD	M±SD	M±SD	M±SD			
Average daily sleep time(min)	416.84±81.63	425.71±91.94	440.16±95.75	474±74.70	6.70	<.001	a < c
Level of usual stress	2.91± 0.75	2.94± 0.76	2.92± 0.89	3.00± 0.71	0.29	.834	
Depression level for 2 consecutive weeks	1.88± 0.32	1.84± 0.37	1.81± 0.40	2.00± 0.00	6.42	<.001	a > c a > b
Quality of life (EQ-5D)	0.95± 0.11	0.89± 0.16	0.83± 0.19	0.90± 0.10	84.25	<.001	a > b > c

3.4. CORRELATIONS AMONG AVERAGE DAILY SLEEP TIME DURING WEEKDAYS, PERCEIVED LEVEL OF USUAL STRESS, PRESENCE OF DEPRESSED FEELING FOR TWO CONSECUTIVE WEEKS, QUALITY OF LIFE(EQ-5D), AND DEGREE OF HEARING

The Degree of hearing was shown to have significant Average daily sleep time(min) ($r = 0.68$, $p < 0.001$), Depression level for 2 consecutive weeks ($r = -0.062$, $p < 0.001$), Quality of life (EQ-5D) ($r = -0.236$, $p < 0.001$).

Table IV. Correlations among Degree of hearing, Average daily sleep time, The level of usual stress, presence of depressed feeling for two consecutive weeks, Quality of life (EQ-5D) (N = 4,197)

Variables	Degree of hearing	Average daily sleep time(min)	The level of usual stress	Depression level for 2 consecutive weeks	Quality of life (EQ-5D)
	r(p)				
Degree of hearing	1				
Average daily sleep time(min)	0.68 (<.001)	1			
The level of usual stress	0.011 (0.487)	0.077 (<.001)	1		
Depression level for 2 consecutive weeks	-0.062 (<.001)	-0.027 (0.076)	0.332 (<.001)	1	
Quality of life (EQ-5D)	-0.236 (<.001)	-0.026 (0.096)	0.171 (<.001)	0.294 (<.001)	1

4. CONCLUSION

This is a descriptive survey study to investigate the relationship between mental health variables and the degree of hearing, using raw data from the 7th NHNES, in the population in their 40s and over when the hearing loss occurs generally. The results showed that the score of degree of hearing in those of 40s and over was 1.22 ± 0.52 , indicating mild problems in hearing. The lower degree of hearing was shown to have more negative effects on average daily sleep time during weekdays, presence of depressed feeling for two consecutive weeks, and quality of life (EQ-5D) and had no statistically significant association with the perceived level of usual stress. The decrease in hearing level, as shown by above results, has negative effects many mental health-related variables after middle age, indicating the necessity of habits to maintain hearing health such as noise prevention in workplace, decreased earphone use, and early treatment of inflammatory disease related to ear. It is also considered that, for the populations with hearing loss, the development and application of various convergence intervention programs are needed. This study has a limitation in generalization of the results since it is a secondary analysis of existing national data. The replicate studies are recommended to focus on the subjects and the hearing problems of 40s and over and compare their results with those of this study.

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